

## ID-43

**Behavior of cementitious materials with mineral additions towards the transport of ionic species: application to electrokinetic remediation processes***I. Martínez, M. Castellote**IETcc-CSIC*

Concrete industry is blamed to contribute global CO<sub>2</sub> gas emission into atmosphere between 5% and 7% due to the use of OPC in the production of concrete. Worldwide there is an overwhelming consensus in concrete industry to reduce the carbon footprint of concrete through reducing the bulk portion of cement in the concrete. The use of supplementary cementitious materials, SCMs, is a common practice now-a-days. Pozzolanic materials such as silica fume (SF), fly ash (FA) and granulated blast furnace slag (GGBFS) are commonly used due to unique characteristics of each material in improving the properties of cement concrete.

The incorporation of mineral admixtures as SCMs can prolong the service life of a structure and contribute to its mechanical properties by decreasing the permeability of a material, which reduces the entry of aggressive agents from the environment. Despite the benefits of incorporating mineral admixtures in concrete, studies have indicated that blending of SCMs with Portland cement leads to a more complicated system where the hydration of the Portland cement and hydraulic reaction of the SCM occur simultaneously. The reaction of most SCMs is slower than the reaction of the clinker phases and depends on the chemical composition, the fineness, and on the amounts of reactive phases.

Corrosion of the reinforcing steel is caused by presence of aggressive substances in the interior of concrete that provoke a decrease in the pH of the pore solution. The penetration of chlorides from the environment is one of the most important causes of corruptions, that's why chloride migration, its combination with the cement phases as well as the critical chloride content that cause steel depassivation, have been highly studied. In this field, the determination of the chloride diffusion coefficients has been an important advance to predict the deterioration establishing the model of the process.

Even though the influence of different mineral additions in the chloride combination and the diffusion coefficients of chlorides through concrete has been discussed by the scientific community, the effects of mineral admixtures on electrokinetic remediation processes have not been investigated in depth. From this viewpoint, in this work the influences of SF, FA and GGBFS on the transport of chloride through the pore structure have been evaluated, leading to conclusions in the viability of the application of electrochemical chloride treatments in these materials.